STATUS OF GYPSY MOTH POPULATIONS AT WALTER REED ARMY MEDICAL CENTER AND WALTER REED HOSPITAL ANNEX

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ABSTRACT

Egg mass surveys conducted in September and October of 1988 revealed 1822 egg masses per acre at Walter Reed Hospital Annex and 36 egg masses per acre at Walter Reed Army Medical Center. Gypsy moth populations are sufficient at Walter Reed Hospital Annex to cause noticeable defoliation and treatment is recommended in 1989.

INTRODUCTION

The USDA Forest Service began monitoring gypsy moth populations at Walter Reed Hospital Annex and Walter Reed Army Medical Center in 1987. Egg mass surveys conducted that year revealed low populations at Walter Reed Army Medical Center, and high populations at Walter Reed Hospital Annex. During the summer of 1988, approximately 5 acres of moderate defoliation occured at the Walter Reed Hospital Annex.

On September 15 and November 14, 1988, USDA Forest Service personnel conducted gypsy moth egg mass surveys at Walter Reed Army Medical Center and Walter Reed Hospital Annex. The purpose of these surveys was to determine the status of gypsy moth populations at these Army sites and to determine if intervention tactics are necessary in 1989.

METHODS

Gypsy moth survey plots were randomly selected based upon available host trees (oaks), size of sample area, uniformity between egg mass counts, and available time. At each sample point, a 1/40th acre fixed-radius plot was established.

The fixed-radius plots (radius 18.6 feet) consisted of a tally of all the newly laid (1988) egg masses observed on the overstory trees, understory vegetation, ground litter and duff. The total number of egg mases observed for each plot was then multipled by 40 to determine egg masses per acre using the following equation:

$$Y = 40X$$

where,

Y = egg masses per acre

X = number of egg masses observed in the plot

RESULTS

Walter Reed Hospital Annex

A total of 9 survey plots was established at Walter Reed Hospital (Figure 1). Table 1 presents the number of egg masses per acre at each survey point. Egg masses were detected at each survey point location. Egg mass densities ranged from 80-3720 and averaged 1822 egg masses per acre.

Walter Reed Army Medical Center

A total of 9 survey plots was established at Walter Reed Army Medical Center (Figure 2). Table 2 presents the number of egg masses per acre at each survey point. Egg masses were detected at 4 of the 9 (44 percent) survey point locations. Egg mass densities ranged from 0-120 and averaged 36 egg masses per acre.

DISCUSSION

The gypsy moth is subject to physical and biological factors that help to regulate the population. The availability and suitability of food, site conditions, incidence of natural control factors (predators and parasites), inter- and intra-specific competition, weather effects, as well as many other factors cannot be predicted at this time. The basic guidelines used to predict the degree of defoliation include evaluation of the past defoliation history of the area in question, number of egg masses/acre, size and condition of the egg masses, available preferred food, terrain and risk of larval blow-in following egg hatch. Potential defoliation is categorized as follows: light (1-30 percent); moderate (31-60 percent); and heavy/severe (61-100 percent).

The survey results indicate that gypsy moth populations are high enough to cause moderate to heavy defoliation (31-100 percent) at Walter Reed Hospital Annex. No more than scattered light defoliation, if any, is expected to occur at Walter Reed Medical Center in 1989.

Three management options have been evaluated for managing gypsy moth populations at these Army instalations. These options are offered based upon the following objectives: 1) protecting host tree foliage; 2) preventing tree mortality; and 3) reducing gypsy moth populations. Each is discussed below.

No Action Option

It is possible that gypsy moth populations could collapse of their own accord due to the presence of NPV (nucleopolyhedrosis virus). However, it is not possible to accurately assess the likelihood of such an event with the information on hand. In areas with defoliating level gypsy moth populations (greater than 250 egg masses per acre) viral epizootics generally manifest themselves after significant tree defoliation has already occurred. In areas where defoliation occurs, but where the trees do not need to refoliate, there

probably is not any significant impact on the trees. At worst, there may be a reduction in the rate of growth during that season. However, in areas that are heavily defoliated, and where the trees must expend valuable energy reserves to refoliate, the stage is set for significant impacts (branch dieback and mortality) depending upon tree condition at the time of defoliation.

Trees at greatest risk are those that are presently stressed from other factors, such as: 1) soil compaction from sidewalks, parking lots, machinery and/or heavy foot travel; 2) overmaturity; 3) drought; 4) shock due to recent harvest exposures; and 5) other insect or disease related problems.

Chemical Insecticide Option

The second option is to use a chemical insecticide to control gypsy moth populations. Dimilin (diflubenzuron) is the most widely used chemical insecticide in State-supported gypsy moth suppression projects in the Northeast. Diflubenzuron is an insect growth regulator that disrupts the normal molting processes of immature larvae. The mode of action is to inhibit the formation of chitin, a necessary component of the outer cuticle which causes the affected larvae to die during the molt following treatment. The method of uptake is primarily by ingestion, however, recent research has indicated the possibility of contact activity.

Dimilin is registered by EPA for use in residential areas. It is, however, extremely toxic to aquatic invertebrates, and should not be applied to water or wetlands. Dimilin is available as a 25 percent wettable powder formulation, and the recommended application rate is 1-4 ounces per acre applied in one treatment. With proper application, foliage protection and population reduction of at least 90 percent can be expected.

Microbial Insecticide Option

The third option is to use a microbial insecticide to manage gypsy moth populations. The only biological insecticide currently available for gypsy moth control is a microbial insecticide based on the bacterium Bacillus thuringiensis variety kurstaki. This insecticide is available by a variety of manufacturers and has been used extensively in State-sponsored suppression projects throughout the Northeast in both forested and residential areas. B.t. acts specifically against lepidopterous larvae as a stomach poison and therefore must be ingested. The major mode of action is by mid-gut paralysis which occurs soon after feeding. This results in a cessation of feeding, and death by starvation.

B.t. formulations are available as flowable concentrates, wettable powders, and emulsifiable suspensions. The normal application rates range from 12-20 BIUs per acre in each of one or more treatments. With two applications, foliage protection and population reductions of at least 70 percent can be expected.

Alternatives

With the previously described options in mind, the following seven alternatives have been developed.

Alternative 1. -- No action.

Alternative 2. -- Single application of Dimilin applied aerially at the rate of 2 ounces (formulated material) in 128 ounces of water per acre. Foliage protection and a population reduction of at least 90 percent can be expected.

Alternative 3. -- Ground application of Dimilin at the same rate as that discussed in Alternative 2, but diluted such that the total mixture applied provides adequate coverage of the foliage without excessive runoff. This will provide foliage protection in areas accessible to ground spraying equipment. A significant population reduction should be expected only if all infested trees are accessible to ground spraying equipment.

Alternative 4. -- A single aerial application of B.t. applied at the rate of 12-20 BIUs per acre in 96-128 ounces per acre total mix. An appropriate spreader/sticker should be added at the rate of 2 percent by volume. Expected results would be foliage protection and only a minor reduction in population levels.

Alternative 5. -- Two aerial applications of B.t. at the same rate as that discussed in Alternative 4. The second application should be applied 7-10 days following the first. Foliage protection and a population reduction of at least 70 percent can be expected.

Alternative 6. -- Ground application of B.t. at the same rate as that in Alternatives 4 and 5, but diluted such that the total amount applied provides adequate coverage of tree foliage without extensive runoff. This will provide foliage protection in areas accessible to ground spraying. A significant population reduction is unlikely however, even if all infested trees are accessible to ground spraying equipment.

Alternative 7. -- Same as Alternative 6, except two applications are made; the second 7-10 days following the first. This will provide foliage protection in areas accessible to ground spraying equipment. A significant population reduction is unlikely unless all infested trees are accessible to ground spraying equipment.

RECOMMENDATIONS BY SITE

Walter Reed Hospital Annex

Gypsy moth egg mass counts indicate that moderate to heavy defoliation will occur at this site in 1989. If this is unacceptable, the most effective alternative to implement is Alternative 2. If streams or ponds exist in the proposed treatment area, Alternative 5 will provide adequate effectiveness while minimizing the impact on nontarget organisms. Alternative 4 would likely provide foliage protection but may not reduce populations significantly.

If aerial applications cannot be accomplished, foliage protection could be achieved in areas accessible by ground spraying equipment. Significant population reduction should not be expected however, and the need for retreatment the following year would be likely. With this in mind, our recommendation for ground applications would be (in order of effectiveness):

Alternatives 3, 7 or 6

Walter Reed Army Medical Center

The survey results suggest that it is unlikely that noticeable defoliation will occur in 1989. Our recommendation is to implement Alternative 1, i.e. take no action.

Table 1. -- Number of Egg Masses Per Acre Estimated at Each Survey Point Location at Walter Reed Hospital Annex, November 14, 1988

Plot Number	Egg Masses/Acre
1	400
2	2840
3	2080
4	3720
5	3120
6	1760
7	2280
8	80
9	120

Average = 1822 egg masses/acre
Range = 80-3720 egg masses/acre

Table 2. -- Number of Egg Masses Per Acre Estimated at Each Survey Point Location at Walter Reed Medical Center, September 15, 1988

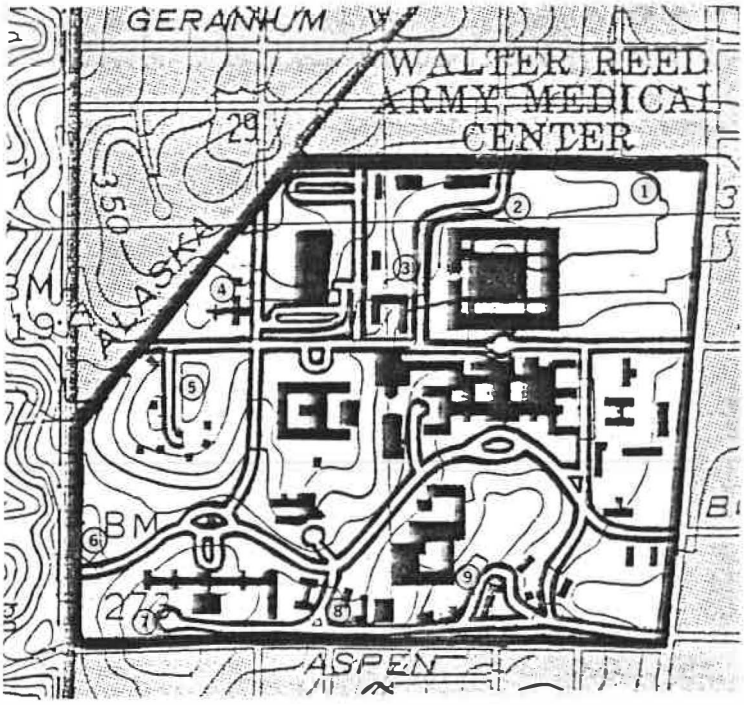
Plot Number	Egg Masses/Acre
1	0
2	0
3	0
4	0
5	120
6	40
7	80
8	80
9	0

Average = 36 egg masses/acre
Range = 0-120 egg masses/acre

Figure 1.--Gypsy Moth Egg Mass Survey Plot Locations, WALTER Reed Hospital Annex, November 14, 1988.

Plot Locations=①-⑨

Figure 2.--Gypsy Moth Egg Mass Survey Plot Locations, WALTER Reed Army Medical Center, September 15,1988.



Plot Locations=①-⑨

United States Department of Agriculture | Forest Service | Northeastern Area State and Private Forestry | 180 Canfield St. Morgantown, WV 26505

Reply To: 3460

Date: January 6, 1989

Mr. Paul Kotanchik
Environmental Coordinator
Walter Reed Army Medical Center
Building 1, Room G-16
6825 16th Street, N.W.
Washington, DC 20307-5001

Dear Mr. Kotanchik:

Enclosed for your information are the results of our gypsy moth biological evaluation conducted at Walter Reed Army Medical Center and Walter Reed Hospital Annex. In summary, gypsy moth populations are sufficient to cause moderate to heavy defoliation (31-100 percent) at Walter Reed Hospital Annex. Defoliation is unlikely to occur at Walter Reed Army Medical Center.

This report presents some treatment options and alternatives based on the following management objectives: 1) protecting host tree foliage; 2) preventing tree mortality; and 3) reducing gypsy moth populations. In this report, we recommend aerial application of B.t. or Dimilin at Walter Reed Hospital Annex.

Call Rod Whiteman or me at 304-291-4133 if you have any questions regarding the survey results or possible management options. We would also be happy to work with you to accomodate your treatment plans.

Sincerely,

NOEL F. SCHNEEBERGER
Entomologist
Forest Pest Management

Enc.
cc: AO
Bob Wardwell
Ruth Salvaggio
Betsie Handley
NFS/RLW/mae